

CLAIMS

I claim:

1. In an *E. coli* RecA protein or a protein having a MAW motif homologous to the *E. coli* MAW motif, a RecA homolog protein mutant, wherein a naturally occurring amino acid residue located within the protein's homolog of *E. coli* residues 40 to 65, inclusive, shown in SEQ ID NO: 1, is replaced with a replacement amino acid residue which is volumetrically larger than the replaced amino acid residue.

2. The RecA homolog protein mutant of claim 1, wherein said replacement occurs at the protein's homolog of *E. coli* residue 43.

3. The RecA homolog protein mutant of claim 1, wherein said replacement occurs at the protein's homolog of *E. coli* residue 52.

4. The RecA homolog protein mutant of claim 1, wherein said replacement occurs at the protein's homolog of *E. coli* residue 53.

5. The RecA homolog protein mutant of claim 1, wherein said replacement occurs at the protein's homolog of *E. coli* residue 54.

6. The RecA homolog protein mutant of claim 1, wherein said replacement occurs at the protein's homolog of *E. coli* residue 55.

7. The RecA homolog protein mutant of claim 1, wherein said replacement occurs at the protein's homolog of *E. coli* residue 59.

8. The RecA homolog protein mutant of claim 1, wherein said replacement amino acid residue is selected from the group of phenylalanine, lysine, tyrosine, arginine, and tryptophan.

1 9. The RecA homolog protein mutant of claim 2, wherein said replacement amino acid residue
2 is selected from the group of phenylalanine, lysine, tyrosine, arginine, and tryptophan.

1 10. The RecA homolog protein mutant of claim 3, wherein said replacement amino acid residue
2 is selected from the group of phenylalanine, lysine, tyrosine, arginine, and tryptophan.

1 11. The RecA homolog protein mutant of claim 4, wherein said replacement amino acid residue
2 is selected from the group of phenylalanine, lysine, tyrosine, arginine, and tryptophan.

1 12. The RecA homolog protein mutant of claim 5, wherein said replacement amino acid residue
2 is selected from the group of phenylalanine, lysine, tyrosine, arginine, and tryptophan.

1 13. The RecA homolog protein mutant of claim 6, wherein said replacement amino acid residue
2 is selected from the group of phenylalanine, lysine, tyrosine, arginine, and tryptophan.

1 14. The RecA homolog protein mutant of claim 7, wherein said replacement amino acid residue
2 is selected from the group of phenylalanine, lysine, tyrosine, arginine, and tryptophan.

1 15. In an *E. coli* RecA protein or a protein having a MAW motif homologous to the *E. coli*
2 MAW motif, a RecA homolog protein mutant, wherein a naturally occurring amino acid
3 residue located within the protein's homolog of *E. coli* residues 40 to 65, shown in SEQ ID
4 NO: 1, inclusive, but excluding residues 47 and 51, is replaced with a replacement aromatic
5 amino acid residue.

1 16. The RecA homolog protein mutant of claim 15, wherein said replacement occurs at the
2 protein's homolog of *E. coli* residue 40.

1 17. The RecA homolog protein mutant of claim 15, wherein said replacement occurs at the
2 protein's homolog of *E. coli* residue 42.

1 18. The RecA homolog protein mutant of claim 15, wherein said replacement occurs at the
2 protein's homolog of *E. coli* residue 44.

1 19. The RecA homolog protein mutant of claim 15, wherein said replacement occurs at the
2 protein's homolog of *E. coli* residue 50.

1 20. The RecA homolog protein mutant of claim 15, wherein said replacement occurs at the
2 protein's homolog of *E. coli* residue 56.

1 21. The RecA homolog protein mutant of claim 15, wherein said replacement amino acid residue
2 is selected from the group of tryptophan, tyrosine, phenylalanine, and histidine.

1 22. The RecA homolog protein mutant of claim 16, wherein said replacement amino acid residue
2 is selected from the group of tryptophan, tyrosine, phenylalanine, and histidine.

23. The RecA homolog protein mutant of claim 17, wherein said replacement amino acid residue
is selected from the group of tryptophan, tyrosine, phenylalanine, and histidine.

24. The RecA homolog protein mutant of claim 18, wherein said replacement amino acid residue
is selected from the group of tryptophan, tyrosine, phenylalanine, and histidine.

25. The RecA homolog protein mutant of claim 19, wherein said replacement amino acid residue
is selected from the group of tryptophan, tyrosine, phenylalanine, and histidine.

1 26. The RecA homolog protein mutant of claim 20, wherein said replacement amino acid residue
2 is selected from the group of tryptophan, tyrosine, phenylalanine, and histidine.

1 27. In an *E. coli* RecA protein or a protein having a MAW motif homologous to the *E. coli*
2 MAW motif, a RecA homolog protein mutant, wherein a naturally occurring amino acid
3 residue located at the protein's homolog of *E. coli* residues 47 or 51, shown in SEQ ID NO:

4 1, is replaced with a tryptophan residue.